SOCIETY PROCEEDINGS

THE HELMINTHOLOGICAL SOCIETY OF WASHINGTON

The twenty-eighth regular meeting of the society was held at the residence of Mr. Crawley Dec. 10, 1915, Mr. Crawley acting as host and Mr. Chambers as chairman. Dr. Cobb presented the following:

Notes on New Genera and Species of Nematodes.—Note 1.—Antarctic Nematodes

The free-living marine nematodes of the Mawson Antarctic Expedition represent twelve species, nine of them new (one new genus), and three species previously described in my report on the free-living nematodes of the Shackleton Expedition. This raises the number of known marine species of Antarctic free-living nematodes to thirty-four, representing eighteen genera, only three of which are new. Considering the small number and the meagerness of the Antarctic collections, these results indicate that Antarctic species of marine free-living nematodes are very numerous and belong to very widely different genera, and for the most part to genera found in warmer seas.

NOTE 2.—*Renette of Cephalobus*

I find that in some species of Cephalobus, and probably in the majority, the excretory or renette duct is bifurcated and passes along the lateral fields to near the posterior end of the body. This structure thus parallels that found in many species of Rhabditis, and as a considerable number of parasitic forms have either rhabditiform larvae, or rhabditiform free-living generations, the possibility is suggested that Cephalobus, or rather some species of it, may be free-living forms connected with parasites. Examination of a large number of marine free-living nemas (a contracted term proposed here for the word nematodes) has strongly impressed me with the possibility that some of these species will in the end prove to be free-living forms of parasites of fishes, marine birds, cetaceans, etc.

NOTE 3.—*A New Form of Nematode Hermaphroditism*

I have a new nematode species that is extremely interesting in the form of its hermaphroditism. The individuals have the form of females, with double sex organs, one of normal size and functioning as an ovary, the other exceedingly small, and appearing to function as a testis.

NOTE 4.—*Subdivisions of Mononchus*

I find the free-living nematode genus Mononchus Bastian, 1866, to be divisible into five very natural divisions, of which the first three form a group considerably differentiated from the two others which may later be raised to the rank of genera.

1. *Mononchus* typical subg.—Pharynx twice to thrice as long as wide; onchus massive, midway or farther forward, unopposed by denticules; pharyngeal walls smooth or transversely striated; males of six species known; ovaries, two, reflexed. Type species *M. truncatus* Bast. Consisting of such species as *M. M. brachyuris* Bütsch.; *M. parvus* de Man; *M. rex* Cobb; *M. fovearum* Duj.; *papillatus* Bast.; *M. intermedius* Cobb; *M. major* Cobb; *M. gerlachei* de Man;

M. macrostoma Bast.; *M. longicaudatus* Cobb; *M. tunbridgensis* Bast.; *M. dadayi* Micol.

2. *Prionchulus* subg. nov.—Pharynx about twice as long as wide; onchus massive, midway or farther forward, opposed by numerous denticules arranged along a longitudinal pharyngeal rib; males of one species known; ovaries, two, reflexed. Type species *Pr. muscorum* (Duj.). Consisting of such species as *Pr. muscorum* (Duj.) and *Pr. spectabilis* (Ditlevsen).

3. *Mylonchulus* subg. nov. — Pharynx goblet-shaped; onchus more or less arcuate, massive, midway or farther forward, opposed by numerous denticules arranged in transverse rows on two rasp-like areas; males unknown; ovaries, two, reflexed. Type species *My. minor* Cobb. Consisting of such species as *My. minor* Cobb and *My. obtusicaudatus* (Daday).

4. *Iotonchus* subg. nov. (gen. nov.?).—Dorsal onchus and all others usually basal, relatively small; large species with large, elongated pharynx, having three longitudinal ribs; tail rather long and slender; males of two species known; ovaries, one or two, reflexed. Type species *I. gymnolaimus* Cobb. Consisting of such species as *I. digiturus* Cobb; *I. bathybius* (Micol.); *I. studeri* (Steiner); *I. tridentatus* (de Man).

5. *Anatonchus,* subg. nov.—Onchi retrorse, midway in pharynx or sub-basal; large species with roomy elongated pharynx; tail long and usually becoming cylindroid; female organs double; males of most of the species known. Type species *A. tridentatus* (de Man). Includes *A. dolichurus* (Ditlevsen).

I have manuscript descriptions of several new mononchs from various parts of the world, all readily referable to one or another of these divisions.

Note 5.—*Finder Slides*

In an article in the Transactions of the American Microscopical Society (34: 1-89) I have suggested the advisability of using co-ordinate numbers, preferably probably minus co-ordinates, dating from the upper right corner of the slide as the origin, or zero point. The slide I am exhibiting is of this kind, and presents the peculiarity that it does not have to be constantly removed and replaced when in use, thus effecting a material saving in time and energy. It consists of a series of coordinates arranged in a small holder adapted to receive and clamp the microscope slide upon and in register with the finder. Light from the microscope mirror passes through the finder and the microscope slide.

In other words, the finder slide is ruled into millimeter squares, each square containing two numbers indicating the actual distance of the square from the right-hand edge of the slide and from the top of the slide, respectively. Under the microscope the normal inversion makes these numbers appear to read from the left-hand side and from the bottom of the slide. The slide which is being studied fits over the finder and is held by two small fixed clamps. By focusing down at any point the two indicative numbers for the corresponding square may be found and noted. The slide is made by photographing a ruled and numbered sheet with such a reduction as will make the photographic squares one millimeter square.

Dr. Stiles presented a note in regard to the sanitary index of three Southern communities, A, B and C. In two of these communities, A and C, the authorities in charge had preached what they regarded as feasible, but comparatively low, standards of sanitation, including the advocacy of the unsheltered or so-called "umbrella privy." In the third community, B, the authorities had taken the position that it was not advisable to advocate something that would have to be combated subsequently, and in consequence high, even if temporarily unattainable, standards had been advocated. After the lapse of a year, the sanitary index of the three communities was again taken and compared with the index for the period of the sanitary campaign of a year before. It was

found that the sanitary index for the two communities A and C had fallen in a year from 28.1 to 24.2 for A, and from 34.6 to 29.4 for C, while the sanitary index had risen for community B from 31.5 to 45. The sanitary campaign in communities A and C was of the revival type with much attendant publicity; that of community C was of a quiet, personal nature without so much attendant publicity. It was found that the umbrella privies built in communities A and C had gone to pieces in a year.

Dr. Stiles also presented a note on memory span studies in children. Of children from homes with privy and those from homes with sewer, it was found that the memory span of the last group compared with that of the first group as 14 to 10. For thirty-six boys and sixteen girls with light infestations with hookworm, the total memory span should have tested 343.24, and did in fact test 339, showing only a very slight variation below normal. For thirty-eight children infested with Ascaris, the total memory span should have been 245.23, and was in fact 250, a slight variation above the normal. For sixty-seven children infested with *Giardia* (*Lamblia*), the total memory span should have been 441.6, and was in fact 444, a slight variation above the normal. For fifty-five children infested with *Entameba coli,* the total memory span should have been 367.29, and was in fact 376. It therefore appears that while children from sanitary homes show a superiority over those from insanitary homes, so far as the memory span is concerned, of 14 to 10, the presence of slight infestations with hookworm, ascarids, *Giardia or Entameba coli* appear to bear no appreciable relation to the memory span.

MAURICE C. HALL, *Secretary.*

The twenty-ninth regular meeting of the society was held at the residence of Dr. Stiles Jan. 28, 1916, Dr. Stiles acting as host and Dr. Pfender as chairman.

Dr. Stiles presented a note in regard to cases of spurious parasitism. A slug, said to have been passed by a patient in Baltimore, and identified by Dr. Paul Bartsch as *Limax flava,* was shown to the society. In a second case, a physician had for years been regarded as presenting a case of multiple infestation with *Cysticercus cellulosae,* this being the diagnosis of the patient and of several other physicians. A physician who had examined the patient called in Dr. Stiles, and their examination disclosed the fact that the patient was addicted to the use of drugs administered by the usual hypodermic method. The patient's failure to us a properly sterilized needle had led to the formation of the small swellings which were present over the arms, legs and the portions of the body accessible to the needle, but significantly absent over the back. These swellings constituted the supposed cysticerci. One of these swellings when excised and sectioned showed connective tissue and pus. Dr. Stiles also noted the fact that the pulp vesicles of an orange had been sent to him with a diagnosis of *Dicrocoelium lanceatum,* and predicted that next spring and summer there would be the usual amount of hairs from the strawberry sent in as supposed specimens of pinworms and hookworms. He also recalled the sending in of a specimen, said to have been vomited by a boy and supposed to be parasitic, which proved to be a placental structure, apparently from a cat, and called attention in this connection to the historical *Spiroptera hominis,* which had proved to be the entrails, eggs and encapsulated nematode parasites of fish, which had evidently been introduced into the vagina by a hysterical woman patient.

Dr. Ransom presented the following notes on spurious parasitism: There was at one time in Washington a man who was accustomed to come to the Bureau of Animal Industry with an account of a peculiar affliction consisting in his being parasitized by insects which would suddenly appear in the skin,

quickly emerge and fly away. The man appeared sane on other topics. Dr. Ransom also noted a case in which supposed flukes were sent in as having been vomited by a boy. Examination showed them to be earthworms. In another case of a similar nature the supposed parasites proved to be two earthworms and a slug.

Mr. Crawley noted a case in which blood smears were sent in with the report that they showed blood parasites. These objects proved to be a common fungous structure which occurs in feces of all sorts almost anywhere.

Dr. N. A. Cobb gave a stereopticon demonstration, discussing about thirty species of nematodes found in the sand of slow filter beds from the filtration plants of various cities, and presenting three notes thereon:

Notes on Filter-Bed Nematodes.—Note 1.—Predaceous Nematodes

The discovery of nematodes in tap water led me to an investigation of conditions at filtration plants. Nematodes were found on the walls wet with spray at the flumes where the filtered water enters the city's supply. At the end of the period of use, usually a few weeks, the sand in the beds was found to contain hundreds of millions of nemas per acre in the top 3 inches. In one case, where the tale reached about one thousand million nemas per acre, nine tenths of the specimens were of one species, the predaceous *Mononchus longicaudatus* Cobb, which feeds on other nematodes, protozoa, etc., and hitherto known only from soil. This species is cosmopolitan. Another mononch, the *Mononchus papillatus* Bastian, I have shown, feeds on the citrus-root nema, an injurious parasite of various citrus trees, and there is a possibility that the filter-bed form may be economically serviceable in destroying injurious nemas. The filter-bed form is interesting from the fact that good preparations show that the esophagus is supplied with glandular structures opening into the lumen.

Two vegetarian species of *Monhystera* were found in the filter beds feeding on microbes and other organisms, and a species belonging to a new genus has the same food habits. *Ironus ignavus* Bastian and *Ironus longicaudatus* de Man, also found in large numbers in the filter beds, show in the cells of the intestinal walls doubly refractive granules which have also been found in the lumen of the intestine, indicative of a cannibalistic food habit. *I. ignavus* has an interesting egg, with peculiar chromatic elements scattered through its cytoplasm. In both forms the renette, hitherto undiscovered, is well developed and empties near the lips. Both have esophageal (salivary?) glands emptying into the pharynx.

Tripyla monhystera de Man is a very active, rapacious, carnivorous nema feeding on other nemas and on rotifers and protozoa, and is very common in filter beds. It suffers from what appears to be a protozoan disease, the protozoan usually invading it in the region of the tail, the invasion progressing most rapidly along the lateral fields. The affected nemas lose their normal activity and show signs of disease. The infection terminates, at least at times, in the death of the host.

NOTE 2.—*Syngonism and Parthenogenesis; Cryptogenesis*

Among these filter-bed nemas I have quite a complete series from bisexual species, through those showing obvious syngonism with prominent development of sperm in the gone followed by egg development, to those syngones in which the sperm development is rapidly accomplished and results in relatively inconspicuous though functional sperms. So complete is this series, ending in sperm discoverable with the utmost difficulty on account of minuteness, that

the fact that in any particular case the presence of sperm was not demonstrable, as, for instance, was the case in a species of Ironus, could not be regarded as proving its absence. Since in syngonism there is a single primordial gonic cell which by division gives rise to sperm and then to eggs in the same gone within a very short time, the idea is suggested that instead of this cell division producing these various elements and then a little later uniting them in the process of fertilization, the essential processes might occur in the earlier unicellular stage and the whole affair be consummated as a more nearly simultaneous instead of a consecutive process. This theory I suggest for consideration in connection with parthenogenesis. Such a method of reproduction, if it exists, I would denominate cryptogenesis.

NOTE 3.—*Revision of the Genus Cylindrolaimus*

Careful examination of a new species of *Cylindrolaimus* from the Washington filter beds has led to a more complete characterization of Cylindrolaimus, and a revision of the genus, as follows:

Cylindrolaimus de Man, 1884.—Small squatic or meadow-land species, with naked, striated cuticle; cephalic setae, four, spreading, submedian; pharynx long, narrow, cylindrical, unarmed; lips rudimentary or none; labial papillae exceedingly minute; amphids circular, depressed; esophagus cylindroid, valveless, with well-developed cylindrical cardia; intestine thick walled, granular, not tessellated; tail moderately long, usually blunt, containing three caudal glands emptying through a plain, rounded, unarmed spinneret. Ovary single, outstretched; with a small branch on the other side of the vulva. Males rare or none, and, so far as known, having two equal, arcuate spicula, with very rudimentary accessory piece; male supplementary organ one, simple, slightly elevated, opposite the spicula; *C. communis* de Man denominated type species by de Man.

Key to Species Thus Far Referred to Cylindrolaimus

The last species (5, 6, 7 and 9) are not cylindrolaimi; the genus to which each may belong is suggested in parenthesis:

Bulb about pharynx, none; ovary one (except in No. 6); tail simply conoid; head rounded; amphids as wide as pharynx.....	*f-communis* de Man 1
Amphids half as wide as pharynx; ceph. setae half long as head is wide; oes. 20%; spin. symmetrical	-f *obtusus* n. sp. 2
Ceph. setae papilloid; oes, 14%; spinneret asymmetrical	*? melancholicus* de Man 3
Tail conoid, then cylindroid; head more or less truncate; pharynx twice long as head is wide; ceph. setae four or none; uterus and ovary simple; amphids minute or none; ovary reflexed; amph. small entering obliquely ..... (Cylindrolaimus?)	'f *tristis* Ditlevsen 4
Ovary outstretched; no amphids, setae or spineret ..... (Gen. nov.?)	-f *macrurus* Daday 5
Uteri 2; ovaries reflexed; amphid a spiral ..... (Plectus?)	'f' *aberrans* Micoletzky 6
Pharynx as long as head is wide; cephalic setae 6.....(Prismatolaimus?)	-f *politus* Daday 7
Cephalic setae 4.....	-f *brachystoma* Hofmänner 8
Bulb of pharynx distinct; ovaries 2; setae none ..... (Ethmolaimus?)	? *lacustris* Hofmänner 9

C. obtusus n. sp. $\frac{3.2}{2.0}$ $\frac{10.}{2.6}$ $\frac{22.}{3.3}$ $\frac{-58.^{18}}{3.5}$ $\frac{87.}{2.8}$ .6 mm. Resembles *C. communis*, from which it differs in the form of the female sexual organs, the cephalic setae, and form and size of the amphids. Ventral excretory pore opposite the middle of the pharynx. Appears to be digonic, since the small outstretched posterior branch of the sexual organ appears to function as a testis. Habitat: sand-filter beds, Washington, D. C.

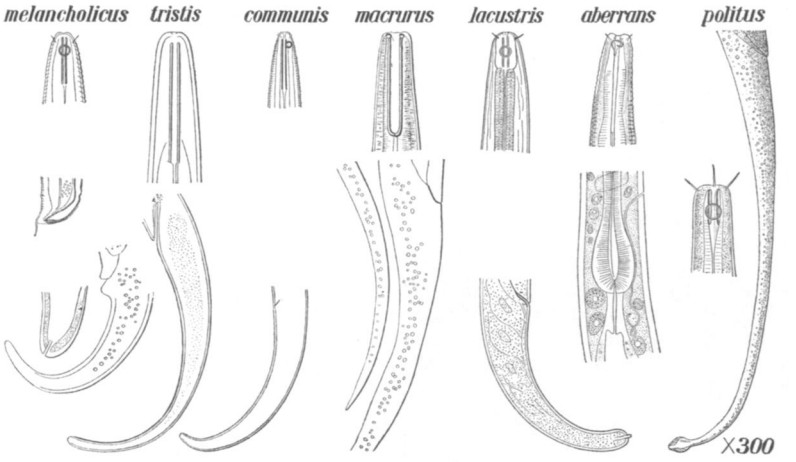

Fig. 1.—Heads and tails of species of *Cylindrolaimus* referred to in the key, reproduced from illustrations in the published descriptions of the species.

melancholicus $\frac{1.7}{1.7}$ $\frac{?}{?}$ $\frac{14.}{3.}$ $\frac{53.^{21}}{3.8}$ $\frac{90.}{2.5}$ 1.3 mm. ***minchlicus*** $\frac{1.7}{1.7}$ $\frac{?}{?}$ $\frac{14.}{3.}$ $\frac{M}{3.8}$ $\frac{90.}{2.5}$ 1.1 mm.

communis $\frac{3.9}{1.8}$ $\frac{11.7}{2.5}$ $\frac{19.3}{3.}$ $\frac{56.^{21}}{3.7}$ $\frac{88.5}{2.3}$ 64 mm. ***tristis*** $\frac{3.}{1.1}$ $\frac{?}{?}$ $\frac{26.}{?}$ $\frac{'59.^{12(?)}}{1.5}$ $\frac{92.6}{1.3}$ 1.8 mm.

macrurus $\frac{3.6}{2.1}$ $\frac{?}{?}$ $\frac{18.7}{3.8}$ $\frac{51.8}{4.4}$ $\frac{77.}{2.5}$ 1.4 mm. ***aberrans*** $\frac{3.9}{1.9}$ $\frac{9.}{2.4}$ $\frac{15.}{2.8}$ $\frac{'44.^{21}}{3.}$ $\frac{81.}{1.7}$ 1.1 mm.

politus $\frac{1.4}{1.5}$ $\frac{6.1}{2.5}$ $\frac{16.}{3.4}$ $\frac{-60.}{3.4}$ $\frac{81.}{1.8}$ 1.1 mm. ***lacustris*** $\frac{2.8}{2.6}$ $\frac{?}{?}$ $\frac{16.6}{?}$ $\frac{50.+}{2.9\text{-}5}$ $\frac{84.5}{3.2}$ .7 mm.

Fig. 2.—The formulae of the species referred to in the key.

Dr. Pfender presented a note in regard to a patient who thought that he had a tapeworm. Radiographs presented by Dr. Pfender showed that the symptoms which the patient referred to were due to nephrolithiasis. A nephrectomy was performed and the stones, one large one and numerous smaller ones, which had been found in the kidneys, were exhibited.

MAURICE C. HALL, *Secretary*.